

An Investigation on Adherence to the Daily Dietary Intake Recommendations among Pregnant Women in Jigawa North-West Zone, Nigeria

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Abstract: *Introduction: Past investigations revealed that there were no specific recorded data available on the adherence to the daily recommended dietary intakes among pregnant women in Jigawa North-West zone in Nigeria.*

Purpose: This study investigates the adherence of a cohort of pregnant women to the daily dietary intake recommendations in Jigawa north west zone, Nigeria.

Methodology: The study cohort was population based of enrolled pregnant women who routinely attended the antenatal care of the General Hospital Kazaure (GHK), Jigawa state, Nigeria. A total of 207 pregnant women were enrolled for the study, where a descriptive study was conducted using Semi-Quantitative Food Frequency Questionnaire (SQFFQ) administered in a face to face interviewed-administrated procedure.

Data Analysis: Data obtained were presented using descriptive statistics, relative frequencies and charts. The analysis was done using the SPSS statistical software package and the level of significance was set at $p < 0.05$. The data analyzed were presented as frequency tables. Pearson chi-square (X^2) and t-tests were used to test for associations between categorical and continuous variables, respectively.

Results and Conclusion: The results revealed that most of the pregnant women in the zone do not adhere to nutritional guidelines in their pregnancy, none of the enrolled women met the recommendations for all the Five Food Groups (FFG). Adherence on some of FFG varies more with their socioeconomic characteristics than their locations

Keywords: Dietary Allowance, Dietary Habits, Pregnant Women, Jigawa North-West Zone.

I. INTRODUCTION

It has been clearly indicated that nutrition during pregnancy has greater effects on fetal health and pregnancy duration, it has a longer term effects on the offspring's health during growth from childhood to adolescence. The importance of sufficient nutrition in any community cannot be overstated, especially in light of the vicious circle impact that undernutrition can cause from conception to birth, childhood, adolescence, and pregnancy in the following generation. Inadequate mother nutrition during pregnancy will result in poor nutrient secretion in breast milk, which will have a long-term negative influence on the child's health (Adinma et al., 2017). According to reports, a nursing woman makes 700 - 800 mL of milk each day, which necessitates an additional 500 calories per day in energy (Adinma et al., 2017). In Nigeria, one among the developing country food insecurity in terms of the major micro and macronutrients deficiencies is dominant and remains the major determinant of maternal and child Healthcare. In New Zealand, one among the developed countries, maternal and child malnutrition is found to be predominantly a combination of macronutrient over nutrition and micronutrient under nutrition. According to (Morton SM, Grant CC, Wall CR et al., 2014) the effects of which was proved by the National Nutrition Survey of NZ-2008/2009 in the country, where obesity was present in 14% of women aged 15-19 years, 25% of those aged 20-30 years and 28% of those aged 31-50 years.

According to (Ogechi, 2014), in south-eastern Nigeria, malnutrition was discovered in a research done among Igbo-speaking women. Other research from various locations of Nigeria revealed that the majority of pregnant women eat

leafy green vegetables of various species. For example, IkongUbong (*TelfaviaOccidentalis*) and Afang are popular among women in Akwalbom state in south Nigeria, whereas Berom pregnant women in northern Nigeria eat *Amaranthus* sp., okra, garden egg, and lettuce (Badi et al., 2012). This practice resulted in several cases of malnutrition among pregnant women in the area. According to Sholeye et al., (2014) and the World Bank (1994), several food preparation procedures in Nigeria and other countries are known to degrade the nutritional value of the foods we eat, aggravating the case of malnutrition in pregnant women. Some of these noteworthy elements include parboiling rice and blanching vegetables, which involves immersing them in boiling water for 10 minutes and then decanting the liquid before boiling the vegetables (Sholeye et al., 2014 and World Bank. 1994). This is different to the source of malnutrition for the Berom women of northern Nigeria, which findings found that 8% of them fried their vegetables, while 17% ate them raw, 5% boiled them, and 70% steamed them (Badi et al., 2012). It is therefore critical to the research world to pay attention to the nutritional status of pregnant and lactating women at different stages of their pregnancy and breastfeeding. Research data on nutritional health among pregnant women in Nigeria is scarce. The goal of this study is to determine the suitability of pregnant women's nutritional consumption in Jigawa North West, Nigeria, by comparing the results to the obtainable average requirements.

In a research recently conducted on Dietary habits and diversity among pregnant women in Lagos, Nigeria (Foluke A. O., et al, 2021), recounted that, according to Nigeria Demographic and Health Survey (NDHS, 2013), the prevalence of undernutrition and over nutrition among women aged 15 to 49 years in Nigeria are 11% and 25%, respectively. Though the World Health Organization (WHO) and Food and Agricultural organization of the United Nations (FAO) recommends consumption of at least two servings of fruits and three servings of vegetables per day, approximately 16.0 million (1.0%) disability-adjusted life years and 2.8% of deaths worldwide (1.7 million) have been attributed to low fruits and vegetable consumption. Most pregnant women in Nigeria have been shown to consume vegetables but almost half of them still avoid eggs, fish, meat, and chocolate beverage which are high in protein needed by the fetus because of taboos according to (Adinma J., et al, 2017 & Fasola O., et al 2018).

Maternal and child undernutrition is highly prevalent in low and middle-income countries, resulting in substantial increases in mortality and overall disease burden. It is revealed that in Nigeria, 32% of children younger than five years are stunted, 3.5% are severely wasted, 20.2% are underweight (Abera S.F. et al, 2020). More than one third of child deaths and 11% of the total disease burden worldwide are due to maternal and child undernutrition. Maternal undernutrition increases the probability of poor pregnancy outcomes and contributes to at least a fifth of maternal death globally. According to World Food Program, approximately half of all pregnant women in developing countries are anemic which causes about 110,000 deaths during childbirth each year (Bhutta Z.A., 2013). Moreover, underweight babies from malnourished mothers are 20% more likely to die before the age of five. Other causes of maternal death are all strongly associated with maternal malnutrition (Say L., & Daniel et al, 2014).

According to the National Guidelines for the Prevention and Control of Micronutrients Deficiencies in Nigeria (NGPCMDN, 2021), the Nigerian government revised policy on food and nutrition which sets new targets to be attained by year 2025, as it relates to micronutrient malnutrition. Some of the highlights include increasing the Exclusive Breastfeeding rate from the 29% level (NDHS 2018) to 65% by the year 2025; reducing childhood wasting including all forms of Severe Acute Malnutrition (SAM) from the 7% level in 2018 to less than 5% by 2025; increasing the coverage of VAS from 45% in 2018 to 65% by 2025; increasing zinc supplementation coverage in the management of childhood diarrhea from the 23% of 2018 to 50% by 2025 for all children requiring treatment for diarrhea; increase the coverage of children under five years that are dewormed from 13.4% coverage in 2013 to 50% by year 2025 as well as reducing the prevalence of anemia in pregnancy from 61% in 2018 to less than 40% by 2025. In its effort towards achieving the targets, the Nigerian government launched a policy; National Policy on Food and Nutrition (NPFN, 2016) and issued a Ministerial Order (MO 2021) which approved and permitted the use of multiple micronutrient supplements (MMS) during pregnancy. This is based on the (WHO 2020) recommendation on antenatal care for a positive pregnancy experience. The United Nations International Multiple Micronutrient Antenatal Preparation group has further evidence that suggests the cost effectiveness and programme efficiency of the use of MMS. The MMS that contains 13 to 15 components have been found efficacious and thus approved for use in Nigeria.

Justification

The benefit that could be derived from the outcome of this research work includes: determining the level of nutritional practices of those expectant mothers of the study. The result of this investigation will also be important to health officials, ministry of health and the general public on how to control dietary deficiency during pregnancy and pre-pregnancy period. Dietary assessment on the other hand will serve as the foundation for appropriate nutritional counselling and intervention. It will also enable investigators and clinicians to identify both poor and desirable food habits and dietary patterns, and thus is fundamental in determining the risk of inadequate intakes of specific nutrients, possibilities for dietary improvement, and the potential need for supplementation of individual pregnant women in Jigawa North West Zone through antenatal schemes. The study will also provide more evidence-based information related to adherence of the pregnant women of the Jigawa state to the daily recommendation in general, particularly Jigawa North West zone. The findings will help government, policy makers, stakeholders and service providers on how best they can provide enough supplements for these nutrients component to Antenatal Care (ANC) Clinics and education on the importance of the supplements as they are fundamental to public health and to social, human and economic development.

Methods: Study design and Sample

A cohort of pregnant women attending routine antenatal care unit of the General Hospital Kazaure (GHK) in Jigawa State, Nigeria was used for the study. All pregnant women that attended the Mondays routine visit between 8th January 2024 and 22nd January 2024 were recruited the population of the study. They came across the local government areas of the zone, controlled to Kazaure, Gwiwa, Roni, and Yankwashi LGAs which constituted one-third of the local government areas in the zone. Information about the study was adequately communicated to the participating antenatal care attendees before been enrolled into the survey. A total of 207 pregnant women were enrolled and filled the structured Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ). A non-probability sampling method is used in the selection of the sample areas of the research. Quota sampling and convenience sampling is employed in enrolling the pregnant women for the physical face to face administration of the SQ-FFQ.

Data collection

A Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) was administered by the trained personnel in the ANC unit to obtain the required data. Questions regarding nutritional habits and practices were included in the survey. Dietary habits and perceptions, dietary supplements preferences, attitudes and practices regarding gestational weight gain, sociodemographic physiognomies and other pregnancy-related characteristics were captured in the SQ-FFQ. The study survey outcomes report from twenty-one (21) questions that are related to its intended purposes, these include six (6) questions regarding sociodemographic characteristics, seven (7) questions regarding pregnancy-related characteristics, five (5) questions regarding dietary habits during pregnancy and three (3) questions regarding perceived healthiness of dietary consumption. The nutritional consumption questions assessed number of daily servings consumed from each of the FFG during an average of pregnancy. Information on whether changes were made to dietary consumption specifically during pregnancy was collected rejecting changes that were not deliberate. Reasons for making dietary changes or otherwise was captured. Dietary quality perceptions in respect of the healthiness of their diet during pregnancy was captured, whether they believed their diet during pregnancy was 'more-healthy', 'less healthy' or whether there was 'no change in healthiness' compared with their usual pre-pregnancy diet; and whether their level of concern about healthy eating changed as their pregnancy progressed. The respondents (enrolled pregnant women) were asked to estimate the number of servings consumed from each of the Five Food Groups (FFG) and 'unrestricted choices' during an average week of their pregnancy.

Table I: Demographic characteristics of the enrolled expectant mothers in the antenatal care unit of General Hospital Kazaure.

Characteristics	Frequency	Relative Frequency (%)
Maternal Age (Years)		
<20	47	22.7
20-29	92	44.4
30-39	51	24.6
>40	17	8.2
Residence (Town)		
Kazaure	121	58.5
Roni	30	14.5
Gwiwa	15	7.3
Yankwashi	16	7.7
Others	25	12.1
Educational level		
Primary	30	14.5
Secondary	72	34.8
Tertiary	21	10.1
None	84	40.6
Household Income		
<₦20,000	171	82.6
₦20000-₦40000	24	11.6
₦41000-₦50000	11	5.3
>₦50000	1	0.5

Illustrations of the amounts and types of foods equivalent to a serving from each of FFG were provided (Figure: I) as depicted in the National Guidelines for the Prevention and Control of Micronutrient Deficiencies in Nigeria (NGPCMDN, 2021). “According to the guideline, applying dietary strategies to improve the status of micronutrients such as iron, zinc, vitamin A and iodine in Nigeria requires dietary modification and diversification to achieve a sustainable, economical, equitable, and culturally acceptable strategy that can be used to alleviate several micronutrient deficiencies”. It further stated that these strategies should be community-based and be used to enhance awareness of micronutrient deficiencies in the community and help to empower people to be more self-reliant. To implement these dietary strategies effectively, knowledge of local dietary patterns, the availability, cost of foods, food beliefs, preferences, and taboos are required, as well as the ability to change attitudes and practices. For effectiveness, the dietary strategies must be practical, culturally acceptable, economically feasible, and sustainable to the target group. They must not include substantial changes in the types and quantities of food items commonly consumed. They must also not increase the price of the food item or the preparation and cooking time, which will increase the workload of a caregiver. Furthermore, they should be based on existing food consumption patterns, and be adapted from local food processing procedures and recipes.”

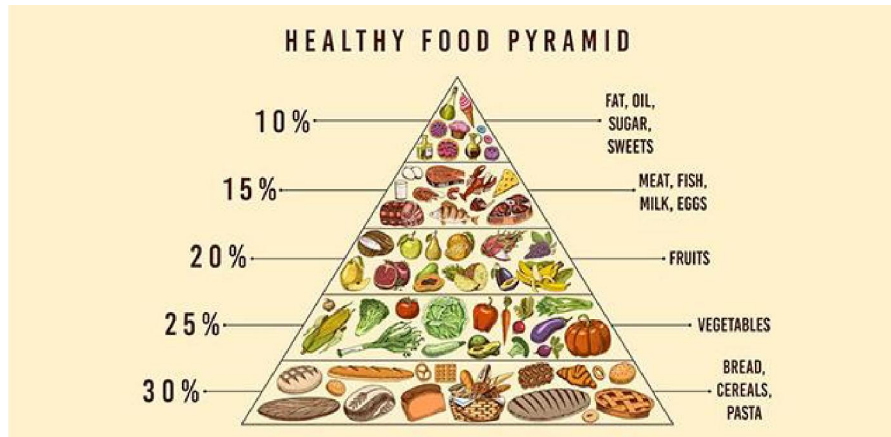


Figure I:

Source: National Guidelines for the Preventions and Control of Micronutrient Deficiencies in Nigeria, Federal Ministry of Health Department of Family Health Nutrition Division Abuja, Nigeria, 2021.

For each food group, responses could be recorded as number of daily servings. The average number of daily servings was calculated for each food group prior to data analysis to allow comparison of the actual consumption with the recommended intake for pregnancy from each food group as currently in the National Research Council (NRC, 2019), Recommended dietary allowances.

The SQ-FFQ collected data that allowed description of the frequency of consumption of foods in the five main food groups. In accordance with the National Dietary Recommendations, only one serving of juice or one serving of dried fruits could count towards the total number of servings of fruit per day.

Table: II. Food consumption of the enrolled pregnant women as compared with the usual intake prior to pregnancy and during pregnancy period for the total sample of 207 women attending routine antenatal clinic in GHK between 8th -22nd January 2024.

Food description	Consumed more		Consumed less		No Change		Avoiding Now		Never Consume	
	n	%	n	%	n	%	n	%	n	%
Cereals/Breads (<i>Shinkafa, masara, dawa, dss.</i>)	179	86.5	24	11.6	4	1.9	0	0	0	0
Vegetables/Fruits (<i>ganyayyaki da yayanitatuwa.</i>)	68	32.9	134	64.7	3	1.4	2	1.0	0	0
Milk/Milk Products (<i>Madara, nono, yogurt. dss</i>)	59	28.5	116	56.0	4	1.9	16	7.7	12	5.8
Meat/Meat alternative (<i>Nama da madadinsa.</i>)	55	26.6	132	63.8	6	2.9	8	3.9	6	2.9
Beans/Nuts/Legumes (<i>wake, gyada, dss.</i>)	81	39.1	112	54.1	4	1.9	7	3.4	3	1.5

Statistical analysis

Data obtained were analyzed using the statistical software package SPSS Statistics 20.0 and the level of significance was set at $p < 0.05$. Descriptive statistics were calculated for all variables including frequencies for categorical variables. The data analyzed were presented as frequency tables. Pearson chi-square (χ^2) and t-tests were used to test for associations between categorical and continuous variables, respectively.

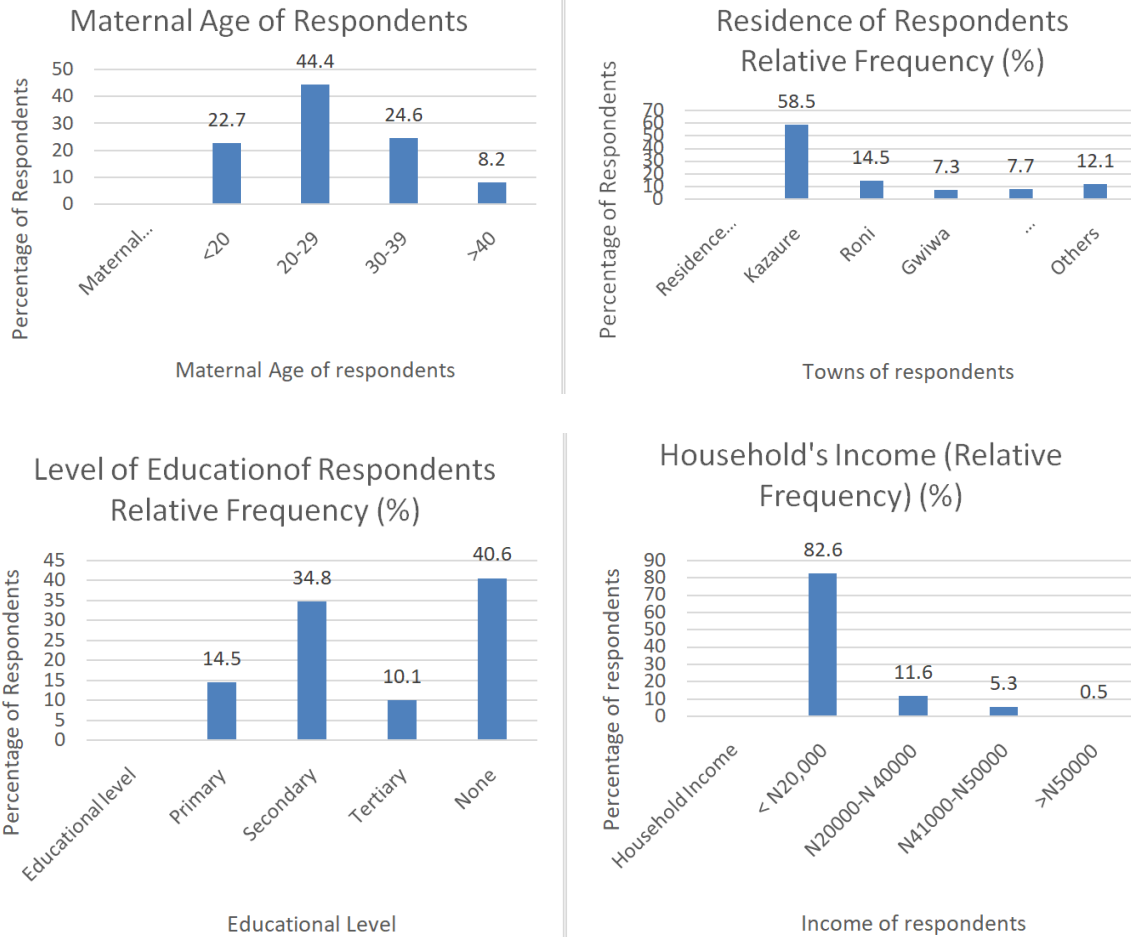


Figure: II. Demographic and socioeconomic characteristics of the enrolled expectant mothers

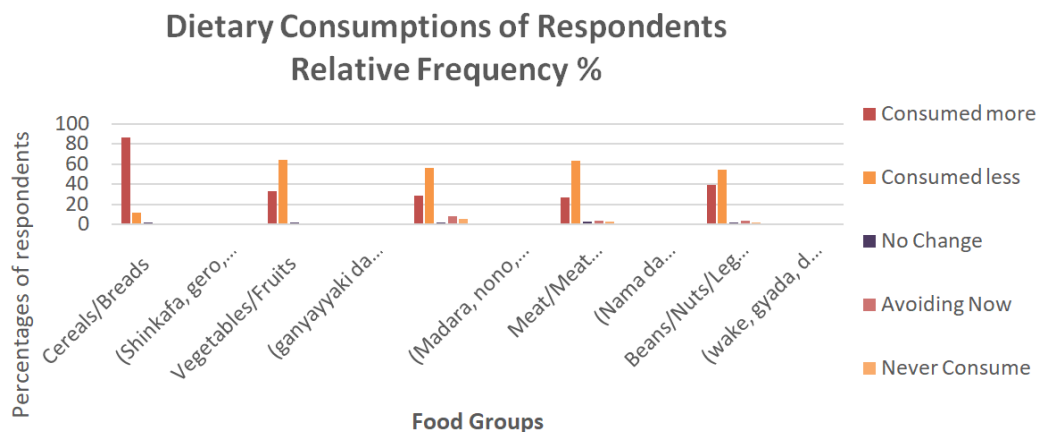


Figure: III. Food consumption of the enrolled pregnant women as compared with the usual intake.

II. RESULTS AND DISCUSSIONS

The total number of respondents that were enrolled and administered the SQ-FFQ were 207 [Table: I].depicted the demographic characteristics of the participants and revealed out some variabilities among them. The mean age of the enrolled participants was 29 years. Predominant number of the respondents were housewives (married) with gravidity count above 2. The relative frequency of 40.6%is recorded for those that did not attainany formal educational level. Thirty-five percent attained secondary level of education and only 10% had tertiary level certificates. Majority, 83% of the respondents earned below ₦20,000 a month [Table: I].

Not much differences were recorded in the consumption of the following food groups within the FFG's, Vegetable & Fruits, Meat & Meat alternatives, Milk & Milk Products and Beans & Legumes with relative frequencies of 64.7%, 63.8%, 56.0% and 54.1% respectively. The enrolled expectant mothers consumed less of these essential food components required for healthy diet of pregnant women. The major and commonest cereal consumed more by the respondents were maize flour, Rice and cassava with relative frequency of 86% [Table: II].

Nearly, half of the enrolled women (45 %) believed that their diet during pregnancy was healthy; very few number with only 2%believed it was unhealthy; and some considerable number amount to 13% believed that there was no change in the dietary quality. Further, 35% believed that their diet during pregnancy was more-healthy and 5 % believed their diet was less-healthy compared with their usual diet in pre-pregnancy. There were no significant differences between respondents with the exception that more women resident within Kazaure metropolis perceived that their diet during pregnancy as 'healthy' compared with those resident within the zone(66 % v. 56 %, P=0.005). Perceived healthiness of diet was significantly associated with meeting the recommended servings of fruit (χ^2 (1, n 207)=19.77, p<0.001) and dairy (χ^2 (1, n 207)= 3.88, P =0.049). In other words, women who perceived their diet as healthy were more likely to consume the recommended servings from these two food groups. There is similarity in associations seen in resident of both towns in the zone, with the exclusion of the dairy association, which was consistent with the respondent within Kazaure metropolitan area. No other significant associations were revealed between perceived healthiness of diet and adherence to the recommendations for the remaining food groups.Within the vegetables/fruit group in comparison a larger proportion of the respondent met the recommendations (76 %) vegetables than they met for fruits (24 %). Eight percent of the women met none of the remaining four food group recommendations and none of the respondents met the recommendations for all theFFG's [Figure III]. Most of the respondent established aninformal awareness of the recommendations for pregnant women to avoid certain types of foods during pregnancy for reasons superficially because such food may have the potential to compromise their health and that of the fetus.

III. DISCUSSIONS

Despite reaching statistical significance in the perception of dietary quality among the pregnant women, the strength of the associations between perceiving dietary intake to be healthy and adhering to the recommendations was insignificant. Almost all the enrolled women believed that their diet was healthy during pregnancy, yet majority did not consume the recommended daily servings of the Five Food Groups. This proposes that pregnant women were not able to assess the quality of their dietary intake. The study did not assess the respondents' knowledge regarding the dietary guidelines but recent review highlighted that nutrition education is generally inadequate during pregnancy despite healthcare providers considering it important (Lucas C, Charlton K &Yeatman H (2014)). Accordingly, increasing awareness and understanding of dietary guidelines may be an important step towards improving women's ability to evaluate their dietary quality against a 'healthy balanced diet', as described by NRC, 2019 and NGPCMDN, 2021.

Emphasis on nutrition education should be placed on obtaining nutrients from the more nutrient-dense foods (included in the five core food groups) rather than non-core foods, which tend to be higher in fat, salt and or/sugar and, in the case of grain foods, lower in fibre. Previous research indicates that main health-care providers during pregnancy (including general practitioners, obstetricians and midwives) may be best suited to providing this information, although they may require additional resources (including time and training) to do so (Malek L, Umberger WJ, Zhou SJ et al. (2015), Lucas C, Charlton K &Yeatman H (2014).The effectiveness of such strategies among women who have poor dietary quality but perceive their diets to be healthy may, however, be influenced by their willingness to increase their nutrition knowledge and understanding of a healthy diet, as suggested by (Kearney J.M and McElhone S., 1999).Generally, despite majority of the enrolled women reportedly making dietary changes specifically for pregnancy, the extent to

which dietary quality changed from before to during pregnancy cannot be determined from the accessible data. From the foregone assessment pregnant women need greater support in making healthy dietary changes and maintaining healthy eating patterns throughout pregnancy.

IV. CONCLUSION

The work reveals that the majority of pregnant women in the study zone perceived their diets to be healthy, yet greatest number do not consume the recommended daily rations from all the FFG's. Stakeholders Involvement in establishing policies aiming to increase pregnant women's capacity to assess quality of their dietary intake in contrast to the recommended dietary guidelines are necessary. As recommended in the justifications of this research that, intervention strategies be established and should target the entire women in the zone and the state in general, to cover all household's categories, from higher to lower-income household's categories, active to less active women, and those that are weakened. It is hoped that, such interventions may encourage constructive dietary changes that conceivably lead to increased adherence to the daily recommendations in pregnancy and feasibly improve pregnancy health effects.

Ethical Concerns

Ethical consideration was observed in the study. Research was conducted according to ethical standards as outlined in the declaration of Helsinki. The ethical approval was acquired from the GHK, Jigawa State. The consent and engagement of the nurses in the antenatal care division was obtained and successfully sustained throughout the data collection period.

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